

Museums for all. Translation and Interpreting for Multimodal Spaces as a Tool for Universal Accessibility^{1 2}

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Abstract

Audiovisual Translation (AVT) has a scientific responsibility to develop analytical methodologies for the textual phenomenon of multimodality, and for the translation strategies associated with it. At the same time, it should aim to provide studies of universal accessibility with a powerful tool for facilitating access to knowledge.

This article offers some reflections on the theoretical foundations of AVT and considers how these are projected in the creation of new professional profiles, with specific application to universal accessibility in the museums.

Resumen

La Traducción Audiovisual (TAV) tiene la responsabilidad científica de desarrollar metodologías de análisis para el fenómeno textual de la multimodalidad así como para sus estrategias de traducción, a la vez que ha de proporcionar a los estudios en accesibilidad universal una poderosa herramienta de acceso al conocimiento.

Este artículo ofrece reflexiones en torno a los fundamentos teóricos de la TAV y a la proyección de estos en nuevos perfiles profesionales; todo ello aplicado a la accesibilidad museística universal.

Keywords: Audiovisual translation. Multimodality. Universal accessibility. Access to knowledge. Museum.

Palabras clave: Traducción audiovisual. Multimodalidad. Accesibilidad universal. Acceso al conocimiento. Museo.

¹ AMATRA Project (P07-SEJ/2660).

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1. Introduction

Audiovisual Translation (AVT) as a modality and a trend within Translation Studies is faced with several challenges which are also great opportunities for expansion and for its establishment as a theoretically and methodologically well-founded discipline. On the one hand, AVT must face the challenge of developing innovative analytical methodologies for the textual phenomenon of multimodality and for the translation strategies associated with it. Although multimodality has always been inherent in any textual phenomena, only over the last few years has there been a real interest in discovering its semiotic properties, its cognitive access features and its semantic potential (Ventola *et al.* 2004: 2). The creation of multimodal texts where image, sound, objects, and written language reach an equal semantic cooperation is the most significant social phenomenon among the texts being produced nowadays. In this respect, AVT should select the theories that can best explain the multimodal composition of the source text (ST) for its subsequent translation; those theories or theoretical constructs should be able to predict and explain how each mode works and interacts with the rest of modes, and to determine the potential translation problems posed by the different modes. To this end, AVT must take into account the existing analyses of multimodal corpora (Baldry 2007 and Bateman *et al.* 2007) and their application to parallel, comparable or translation corpora using different languages and codes. The current analyses on AVT do not transcend subjective introspection, and despite being usually interesting to explain particular cases, do not meet the requirements for generalization.

On the other hand, AVT has a professional responsibility to integrate with the studies on access to knowledge and with those studies on universal accessibility as a resource closely linked to the translation and interpreting process. The ability to make any text using different codes or modes linguistically, cognitively and socially accessible to as many recipients as possible is inherent in the nature of translation. The potential difficulties posed by the broad concept of universal accessibility to knowledge as the philosophy guiding translation will be limited through the study of text genres in multimodal environments (Bateman *et al.* 2007). Those genres, in turn, will provide the basis for the creation of new professional profiles in the field of translation for multimodal spaces. Museums constitute par excellence the text to be translated, and are the best representatives of this new paradigm.

The aim of this paper is to offer a reflection on the three challenges posed here: (a) a reflection on the adequacy and ability of multimodality theories to analyze new source texts; (b) an approach to translation as a tool for museum accessibility; and (c) the need for a social study on the new professional profiles in the field of translation for multimodal spaces.

2. A museum for all

Accessibility is the degree to which a product, device, service, or environment is available to as many people as possible. Originally, this concept referred to the access to the items above for people with disabilities and was born within the framework of the social model of disability. On the one hand, this model demands that society identify and eliminate the barriers hindering or preventing disabled people's autonomy and social integration in equal conditions. On the other

hand, the social model calls for the inclusion of the accessibility concept from the design stage of any products or services in order to facilitate disabled people's integration and autonomy, and for products to be used by individuals with different characteristics (Thomas 2007).

This new concept of disability, together with the demographic changes of the last few decades, has led to an increased awareness about the different needs of the different groups and individuals in society, not only in terms of disability, but also in terms of age (children, young people, elderly people), socio-economic background and culture. This awareness has encouraged the promotion of social policies committed to guaranteeing accessibility for all individuals. In the case of people with disabilities, a core concept closely linked to accessibility is that of autonomy, the former seen as a way to reach the latter (Palacios 2008: 331). In order to describe this evolution in the concept of accessibility towards the inclusion of other social groups, the term universal or comprehensive accessibility has been coined.

When applied to the context of access to art and culture, universal accessibility in museums can be defined as the degree to which each individual can access the physical environment and the contents in a museum, regardless of their personal abilities and interests. The great deal of national and international legislation and guidelines on accessibility confirms the importance of universal accessibility in modern society.

2.1 Legal and institutional framework of universal accessibility in museums

The proliferation of universal or comprehensive accessibility plans for museums is the result of the demands and pressure from social movements led by groups of disabled people. This has coincided with a paradigm shift in the concept and role of museums in which these have turned into agents for social inclusion and for the democratization of knowledge. However, those demands require the support of a legal system that defines cultural institutions' obligations towards universal accessibility.

In order to define the legal framework of universal accessibility in museums it is necessary to review the existing legislation on Human Rights (equality and non-discrimination), Disability, Artistic and Cultural Heritage, and finally, the specific legislation on Museums. The main legal texts on these areas could be summed up, from the general to the particular, in the following: at an international level, the Universal Declaration of Human Rights adopted and proclaimed by General Assembly Resolution 217 A (III) of 10 December 1948, the Charter of Fundamental Rights of the European Union, approved by the European Council in 2000, and the United Nations (UN) Standard Rules on the Equalization of Opportunities for Persons with Disabilities adopted by the UN General Assembly on 20 December 1993; at a European Union level, the European Disability Strategy 2010-2020: A renewed commitment to a Barrier-Free Europe, adopted by the European Commission on 15 November 2010; within Spain, the First National Accessibility Plan 2004-2012 (AAEPLAN), the Spanish Historical Heritage Act [Ley del Patrimonio histórico español (LPHE)] and Act 8/2007, of October 5th on Museums and Museum Collections of Andalusia [Ley 8/2007, de 5 de octubre, de Museos y Colecciones Museográficas de Andalucía].

Regarding the institutional framework for accessibility, nowadays there is an important set of principles and guidelines produced by local and state administrations, non-governmental organizations and associations, charities, cultural and educational institutions, and private companies, which are extremely valuable and useful for all those institutions that must implement the current legislation on universal accessibility in museums. Those guidelines mainly come from the United Kingdom and the USA, the leading countries in this field (RCMG 2004; Smithsonian Institution 2000; American Council of the Blind; Arts Council England). In Spain there are also a significant number of publications on accessibility, but most of them offer a more general approach to accessibility than the above mentioned, or focus on aspects related to accessible urban design, technology and tourism. Therefore, Spain lacks instruments providing useful information and guidelines for the implementation of universal accessibility

plans in museums. Among the few existing publications, it is worth noting those by Consuegra Cano (2009) and Espinosa Ruiz (2002 and 2006).

2.2 Accessibility in museums nowadays

Nowadays accessibility is a widespread concept present in every modern society, be it superficially or in a more developed or committed way. The current scenario includes Museum Studies: museums frequently offer their visitors accessibility resources and declare their commitment to promoting the role of museums as disseminators of all types of knowledge. However, a closer and more thorough analysis of museums' global situation shows that the number of museums having implemented comprehensive accessibility plans is smaller than it may seem, and such museums are usually the most prominent ones in terms of value of their collections, number of visitors and international renown. This is hardly surprising bearing in mind that the design, planning, implementation, evaluation and maintenance of a comprehensive accessibility plan entail a significant financial investment, for it requires a great deal of work by professionals from very different fields. Nevertheless, the promotion of the multidisciplinary collaboration between Museum Studies and other academic and professional fields, necessary for the development of accessibility plans and resources, is fostering a widespread implementation of accessibility resources in museums all over the world. One of these fields is Translation and Interpreting (hereafter referred to as T&I).

In the current international scene there are a large number of museums offering accessibility resources. However, in practice those resources are limited to removing physical barriers for people with physical or motor disabilities. A significant number of museums also include among their services some aids for visitors with sensory disabilities, such as assistive listening devices for the hearing impaired, or Braille signage and leaflets with large print letters for visually-impaired people. However, the number of museums around the world having implemented comprehensive plans to grant access to all types of visitors is still reduced. Those museums are the following: Thyssen Bornemisza, Museo Nacional del Prado, Museo Nacional Centro de Arte Reina Sofia and Guggenheim Bilbao (Spain); Tate Britain, Tate Modern, British Museum and The National Gallery (United Kingdom); Louvre, Cité de Sciences et de l'Industrie and Centre Pompidou (France); Landesmuseum Mainz and LVR Landesmuseum Bonn (Germany); New York's MoMA, Washington's National Gallery of Art (USA); and Melbourne Museum and National Gallery Victoria (Australia). Most of them are Plastic Arts museums; the British Museum is an archaeological museum; the Cité des Sciences et de l'Industrie is a science and technology museum; the LVR Landesmuseum Bonn is a history museum; lastly, the Melbourne Museum embraces history, culture, science and archaeology.

Museum accessibility can be divided into two main areas: (1) accessibility to the museum's physical environment; and (2) accessibility to the museum's contents, namely, by using appropriate exhibition techniques and by elaborating accessibility resources to adapt such techniques to different types of visitors. The following table includes all the universal accessibility resources used nowadays by the abovementioned museums, thus offering a comprehensive list of the resources available according to each type of visitor:

General (adults)	Multimedia guide: images, audio, video Audio guide adapted to different tour durations and contents Self-guided tour adapted to different tour durations and contents Guided tour adapted to different durations and contents Online collection Online virtual tour Online multimedia resources: podcast, video, audio
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Children	Children's audio guide: text adaptation Children's multimedia guide: video, audio, interactive activities Children's website: interactive activities Adapted workshop Adapted guided tour
Teenagers	Teenagers' audio guide: text adaptation Adapted workshop Adapted guided tour
Teachers and students	Teacher's guides (online and on site) Adapted guided tours Adapted workshops
Families	Museum tour preparation guide (online) Learning materials for museum tours (online and on site)
Speakers of other languages	Multilingual multimedia guide Multilingual audio guide Multilingual website and/or information leaflet
Visually-impaired people	Audio guide: information on the tour and location, audio description of the museum space and exhibits Audio description of audiovisual products Voice narration of printed text (Tactile) Guided tour with oral descriptions: group or self-guided tour using an audio guide device Tactile map Scale model Model Reproduction Texture Smell Heat embossing Large-print-letter reproduction High-contrast reproduction
Hearing-impaired people	Sign language guide Guided tour in sign language Subtitling and sign-language interpreting of audiovisual products Audio and video transcription Assistive listening systems: magnetic loop, audio induction loop Audio guide compatible with assistive listening systems
Mentally or intellectually disabled people	Adapted guided tour Adapted workshop Workgroup
Physically disabled people	Adapted building and facility design Museum's accessibility map

Table 1. Classification of museum accessibility resources according to visitor profile

Each type of visitor has specific characteristics which require different accessibility resources. Of all those resources, mobile guides for museums occupy a prominent place in the current museum scene due to their versatility and suitability for different kinds of users. Over the last decade the constant development of mobile computing technology, also known as ubiquitous or nomadic computing, has enabled the creation of increasingly sophisticated mobile guide systems, which not only offer the visitor a great variety of multimedia contents, but also include geolocation functions, customization options, an enhanced and enriched experience, and the

possibility to socially interact with other users. Thus, over the last few years there has been an increasing interest in developing mobile guides thanks to the advances in mobile computing technology. Those advances have in turn been fostered by the unprecedented development and the widespread use of powerful portable devices (netbooks, tablets, PDAs and 3G mobile phones) and wireless networks. The main advantage of these technologies is (according to the paradigm of context-aware computing) the possibility to offer users context-adapted services by using information such as the user's location, the period of time spent in a specific place, the people and objects near the user, and the activities carried out.

Mobile guides for museums, also known as mobile interpretation devices, are portable electronic devices which can support audio, video or both types of contents. Thus, every mobile guide consists of two main elements: (1) the contents, and (2) the hardware or device used for reproducing and accessing contents. Within the museum context, the contents currently available include general audio guides, specific audio guides for visually impaired people, children or teenagers, sign language guides for hearing impaired people who use sign language and general and children's multimedia guides. Regarding the devices used, those range from digital audio players to tablets, including digital media players, PDAs and smartphones.

Museums usually hire external companies for the development of these mobile guides. These companies' multidisciplinary teams of professionals take care of the whole process, from the development of software application and the device's technical specifications (such as exhibit and user geolocation systems) to the creation of contents, which is always done in close cooperation with the corresponding departments of the client-museum. Some of the most well-known companies in this field are Orpheo, Pocket Proof, Ubiquity, Media Access Australia, Audioguiarte, Acoustiguide, Antenna Audio, Art2Guide, Nous, Audissey Guides and iGuide Kulturaufnahme GmbH.

3. Museum accessibility from the perspective of translation and interpreting

3.1 *The museum as a multimodal communicative event: concept analysis*

Studying the phenomenon of multimodal texts is the central objective of the emerging Multimodal Discourse Studies and of Multimodality in general. This has also been a research focus in other disciplines such as Narratology (Ryan 2004), Discourse Analysis (Dijk 2008 and 2009; Biber *et al.* 2007), modern Systemic Functional Grammar (Matthiessen 2007; Royce 2007), Social Semiotics (Thibault 2007) and, above all, in the analyses on the compilation and tagging of multimodal corpora (Bateman *et al.* 2004). There is a consensus that multimodality refers to the construction of meaning through the interaction of different modes or semiotic resources, namely the linguistic mode (the different languages); the visual mode, represented by different types of images, either still, moving or non-verbal, gestures and body language; the acoustic mode, and the tactile/material mode in the case of three-dimensional artistic representations such as sculpture.

On the other hand, museums are currently seen as spaces whose implicit social purpose is clearly that of disseminating knowledge. Museums also serve other specific purposes according to the permanent or travelling exhibitions they host. These purposes determine the activities carried out in a museum, as well as the functions this institution wishes to develop. One of the core functions of a museum is communication (Rivière 1993: 347), as "the exhibition discourse translates scientific discourse". According to this idea, the exhibits in a museum, as any other concept, turn into conceptual objects having a specific function, that is, they become units of meaning which can be analyzed according to their communicative and social function. Thus, the exhibition can and should be considered as a "space for communication and knowledge transmission" (Santacana and Serrat 2005: 52).³

³ Caballero García (1999) calls them museum objects [*objeto museal*] and, quoting Rivière, says that they are documents in a context.

Therefore, the museum becomes an interactive multimodal communicative event and, as such, it conveys meaning through a multimodal discourse which can be arbitrarily⁴ structured as follows: (a) a macro-level of the text (the exhibition as a genre) and (b) a micro-level of the text (the exhibits and the relationships between them as texts that are realizations of text types), both levels being linked to a specific situational macro-context (the museum). Interaction comes from the fact that Museum Studies consider visitors as active museum agents. It is not the scientific curator who structures the communication between exhibits and visitors. It is the museum that crosses over the wall of non-interaction to find out about social discourses and offer responses for all of them (Caballero García 1999), that is, to interact.

3.2 Theoretical elements for the analysis of museums as source texts (ST)

Nowadays it is difficult to conceive any textual research work without a representative corpus of texts to support that work. A corpus should also include some type of tagging system adapted to the specific analysis needs of each piece of research. Therefore, in order to describe the possible ways to turn a museum into an accessible space, it would be necessary to list the exhibitions which are accessible to different types of visitors, to tag the multimodal grammar of their exhibits, and to relate them to the translation strategies applied. Such a corpus does not exist yet because—among other reasons—the scientific community is still trying to determine the best way to compile it and tag it, and analyzing the possibilities to associate this corpus with the accessibility translation strategies used⁵. However, the creation of this corpus will provide documentation and significant evidence about the rules followed to make different exhibition types accessible, and also about the particular features of translation when a specific exhibit in a situational context (that is, in an exhibition) is made accessible.

One of the main requirements for a proper interaction is knowing the social characteristics and the cognitive skills and abilities of the addressee (Levinson 2000) so that the exhibition discourse can be approached both from its macrostructure (genre, text type, topic, degree of cognitive accessibility), and from its superstructure (the logical discourse progression) in an optimal (Dijk 2008, 2009) and appropriate way (Grice 1975).

Thus, considering exhibitions as sets of conceptual objects whose function is to convey meaning and which do a first translation of the exhibition (scientific) discourse is the starting point for genre analysis.

The elements for analysis traditionally accepted by linguistic and general communication theories should be taken into account in the first place. The aim of this is to predict and to explain the behavior of certain semantic and pragmatic structures in the texts being analyzed here. From the point of view of genre studies (and rather from the point of view of functional linguistics or linguistic pragmatics than from rhetoric or literary analysis), the first step of this analysis is to determine the most important pragmatic and functional elements to establish communication: the communicative and social-semiotic context and, in connection with it, the interlocutors' prior knowledge about a specific topic and their linguistic knowledge (Levinson 2000). Context is understood here as a dynamic system of structures of any kind which are necessary for the correct understanding of a text and determine the interlocutors' expectations and assumptions (Halliday 1977/2003). There is a covariation relationship between language and context: changes in context bring about variations in the type of language used and vice versa. Different types of exhibition bring about changes in the semiotic mode through which

⁴ The term “arbitrarily” is used here to describe this structuring because the whole museum could also be viewed as a text within a cultural and socio-communicative context made up by the museum owners, the town where it is located, the institutions it may belong to or its specific functions.

⁵ Within the AMATRA Project P07-SEJ/2660, funded by the Andalusian government, a corpus of audiovisual texts has been compiled in which the translation strategies used to make those texts accessible to blind people have been tagged and associated with the ST (Jiménez Hurtado *et al.* 2010).

exhibits convey meaning, and thus, in all probability, in the translation rules to be followed in order to make the exhibit accessible to the different types of visitors.

Particular changes in context, for example variation along an interpersonal dimension of a more or less formal situation, or variation along a textual dimension of more spoken or more written, give rise to particular systematically conditioned changes in the language that occurs. (Bateman *et al.* 2007: 148)

The idea that context is directly linked to the nature of texts is widely accepted by the different and more or less traditional discourse analysis theories (Adolphs 2008). Therefore, on the one hand, museum types (science museums, archaeological museums, contemporary art museums) should be viewed as the socio-cultural context of exhibitions. On the other hand, the specific time and space in which an exhibition takes place, as well as the exhibition's specific function, should be considered as the situational context of its exhibits.

Furthermore, the different types of exhibitions should be studied from the point of view of multimodal genre theories, and their macrostructure should be viewed as the thematic development of the exhibition, where there are given contents and new or focused contents, in the sense given by Ducrot (1972) to this. Superstructure, in turn, is the diagram linking space and time in an exhibition, that is, the logical progression produced by the location of the exhibits in an exhibition, and the logical and space reasons for it.

Once the contexts (museum types) and the genre (exhibition type, set of objects on display and the relationships between each other and their location in space and time) have been studied, the next item to be dealt with is the analysis of the ST itself: the exhibit. Exhibits are par excellence the ST in museums. These ST use a specific type of multimodal grammar which is determined by their own nature (visual, acoustic, linguistic or a combination of them). The concept of grammar is used here in a broad sense, and can clearly be applied to multimodal texts. In the case of videos, this central part of the ST analysis includes a semantic analysis of the objects appearing in an image; a morphosyntactic analysis including the object's morphology, which consists of elements such as color, texture, and size, among others; and a syntactic analysis describing the time-space relation between the objects appearing in a video and the setting where they appear. Finally, the study of images includes a pragmatic and discourse analysis, which focuses on the perspective from which objects are shown in an image. Obviously, this grammar analysis of videos can be applied to other types of exhibits requiring a study of non-verbal visual codes, such as paintings, sculptures, illustrations or objects⁶.

Taken together, these findings suggest that sequential image comprehension uses a grammar that extends beyond semantic associations between individual frames. The comprehension of graphic narrative is guided by an interaction between structure and meaning, akin to that between syntax and semantics in language. (Cohn *et al.* 2011)

For instance, the videos included in the exhibition entitled *Viaje al cuerpo humano* [*Journey through the Human Body*] have been analyzed taking into account this type of experiments which link the perception of a moving image with accessing the information it conveys. When acknowledging the existence of integrated narrative parameters in the way images are stored and interpreted in the brain, then it is possible to do a grammatical analysis of images. By giving the blind visitor information about the image type (graphic, natural, animated or real) and describing the conceptual objects (object type) and their morphology (color, texture, size) the syntax of the image can show the relationship between those elements. It also shows if the movement occurs in a non-marked (left-right) or a marked way (other types of camera movement), or if the shot angle is eye-leveled (or eye-angled) or non-eye-leveled (high or worm's eye angle).

⁶ This is in accordance with the structuralist and functionalist film theories by Metz (1973) and Carmona (1991 and 2002), and with the cognitive film studies by Bordwell (1985 and 1996).

Moreover, the analysis includes elements from the Rhetorical Structure Theory (Mann, Matthiessen and Thompson 1992) which describe how content is elaborated through each complex exhibit. In the exhibition being analyzed here, a module named “Nervous System” has been audio-described. This module consists of a series of panels with written information together with real objects, models, still and moving images, and interactive devices. Between the different modules, as in any other text, there are no typical or standard rhetorical relations such as adhesion or exemplification. On the contrary, the relations between the different modules were in several occasions more complex, and included expanding or reformulating certain information which had to be translated using linguistic expressions that reproduced those rhetorical structures and at the same time avoided excessive repetition or difficulties for processing them along with the rest of semantic information.

The study of the pragmatic and discourse issues is done from three theoretical perspectives that have offered fruitful analyses in areas of general linguistics and particularly in multimodality. Regardless of the visitor studies carried out by a museum—which provide information about the museum’s average visitor and their expectations, needs, ability to access information, degree of interest and attitude towards an exhibition—translators specializing in accessibility need to become familiar with the different theories on access to knowledge, adequacy of texts, relevance and politeness. All these concepts have been studied by linguistic pragmatics and can be applied to accessible translation. In the exhibition being analyzed here and with the different translation and interpreting modalities used in it—particularly when subtitling for the deaf and hard of hearing and doing Spanish Sign Language Interpretation SLI)—when specialized terminology from a particular discipline was used, the cognitive and terminological level of difficulty of the language was analyzed and decisions were made regarding hearing-impaired people’s access to each specific item of knowledge. Once the linguistic and visual analyses had been performed, which included measuring how the visual mode facilitated the understanding of certain linguistic structures, translation decisions were made as regards politeness strategies and the principle of relevance in the text being produced. In the case of certain visitor types, access to knowledge is linked to language politeness insofar as it is considered impolite to use cognitively complex structures in texts addressed to children, and as there is a breach of the cooperative principle when a text offers information having little relevance regarding its communicative function and the addressee’s attitude towards the exhibition. In this connection, when the exhibition modules were adapted to teenage visitors, sticking to their interests was of utmost importance. In those cases, the principle guiding the translation process was the respect for the maxims of relation and manner, together with the inclusion of appeal elements in the text and the use of politeness strategies to catch teenagers’ attention. Examples of this are shown below (see Figure 1).

Once the distinctive traits of exhibits have been analyzed, a second translation act is carried out to make an exhibition accessible to everybody regardless of their sensory impairments (visual and hearing), their cognitive abilities or their personal interests, as will be shown below.

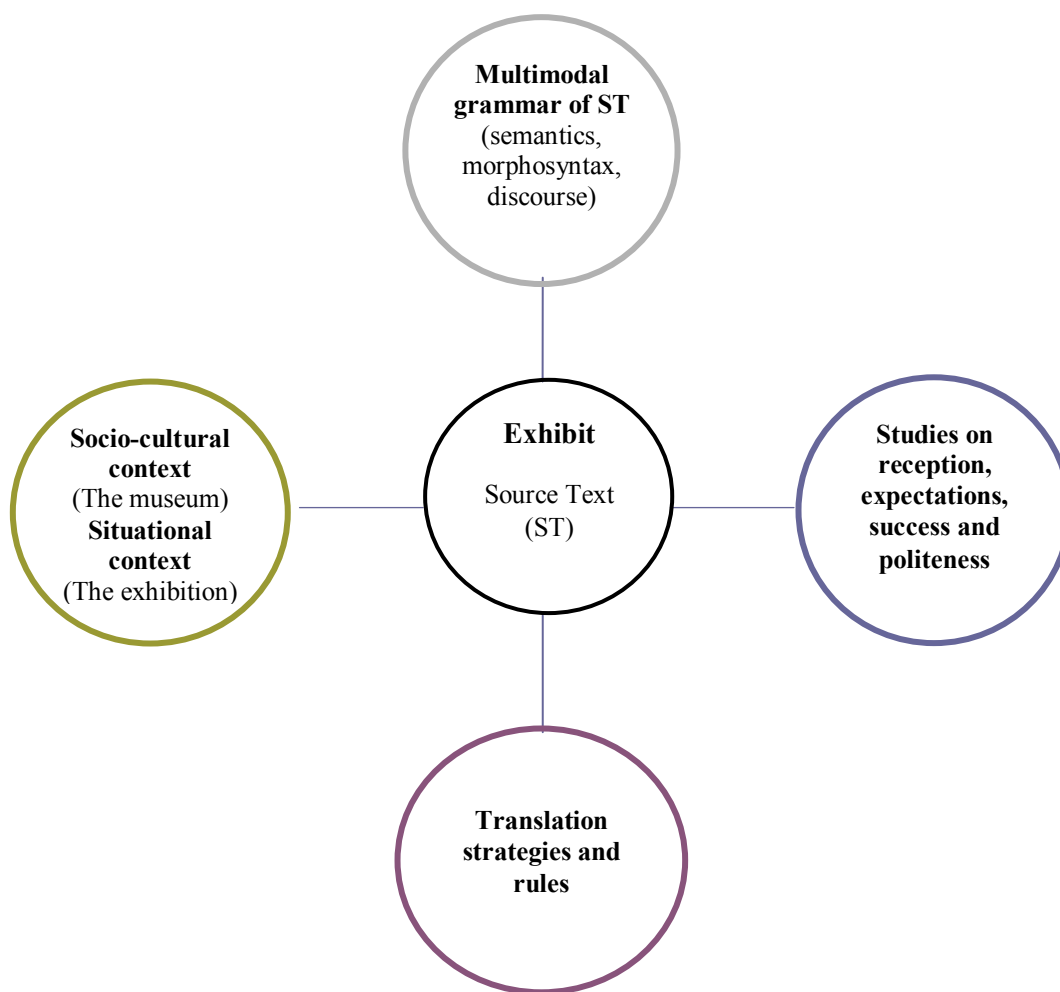


Figure 1. Theoretical elements for the analysis of exhibits as ST

3.3 New professional profiles for translators and interpreters

Apart from acquiring a thorough knowledge in at least two languages, translators and interpreters usually receive a general education which is complemented by specific training to develop their ability to adapt to the specificities of each translation job or project. The Web would not be what it is today without the huge amount of web-content translations done.

Taking into account that museums are institutions subject to ongoing change and that T&I is among the disciplines showing greater dynamism and adaptability to social and scientific developments, the future of museum accessibility definitely lies in the collaboration and interaction between museums and translators and interpreters. In this museum-translator relationship, translators act as experts and advisors on museum accessibility issues, be it by doing sign language interpreting in a guided tour for hearing-impaired people who use this language, by doing subtitles for a video-art festival for oral deaf and hard of hearing people, by verbally describing a sculpture in a tactile tour for visually-impaired people or by adapting a text for children. However, their collaboration is not limited to the above. Besides the use of these new modalities in T&I for museum accessibility, translators and interpreters are required to create the multilingual versions of museums' leaflets, signs, exhibition panels, audio guides, multimedia guides and institutional websites for speakers of other languages. This may seem the clearest and most obvious translation need a museum should meet in order to open its doors to universal accessibility. However, the reality is that very few of these institutions offer multilingual information outside the circle of highly prestigious museums.

Within the framework of Translation Studies, the concept of Accessible Translation and Interpreting was created to refer to a series of T&I modalities⁷ which allow people with sensory disabilities (visual or hearing) to access knowledge and communicate. Nevertheless, as happened with Design for All, this concept has become wider and has broadened its horizons since it became apparent that such modalities could also benefit other types of individuals having specific characteristics other than disabilities. Those modalities include audio description (AD) for visually-impaired people, sign language interpreting (SLI) for hearing-impaired people who use sign language, subtitling for the deaf and hard of hearing (SDH), intralinguistic subtitling and respeaking for oral deaf and hard of hearing people, and text adaptation for individuals having different levels of prior knowledge (lay, semi-lay and expert), cognitive abilities (children, teenagers, young people, elderly people) and interests (hurried visitors, visitors wishing to start studying a particular subject area).

There are different fields of application⁸ for these modalities, and thus a distinction is made between accessible T&I in art and culture (museums and exhibitions, monuments, performing arts), and accessible T&I in Information and Communication Technologies (ICTs) (Web, TV, cinema, videogames), although not all modalities are used in every field. The following figure provides a schematic overview of the modalities and fields of application of accessible T&I.

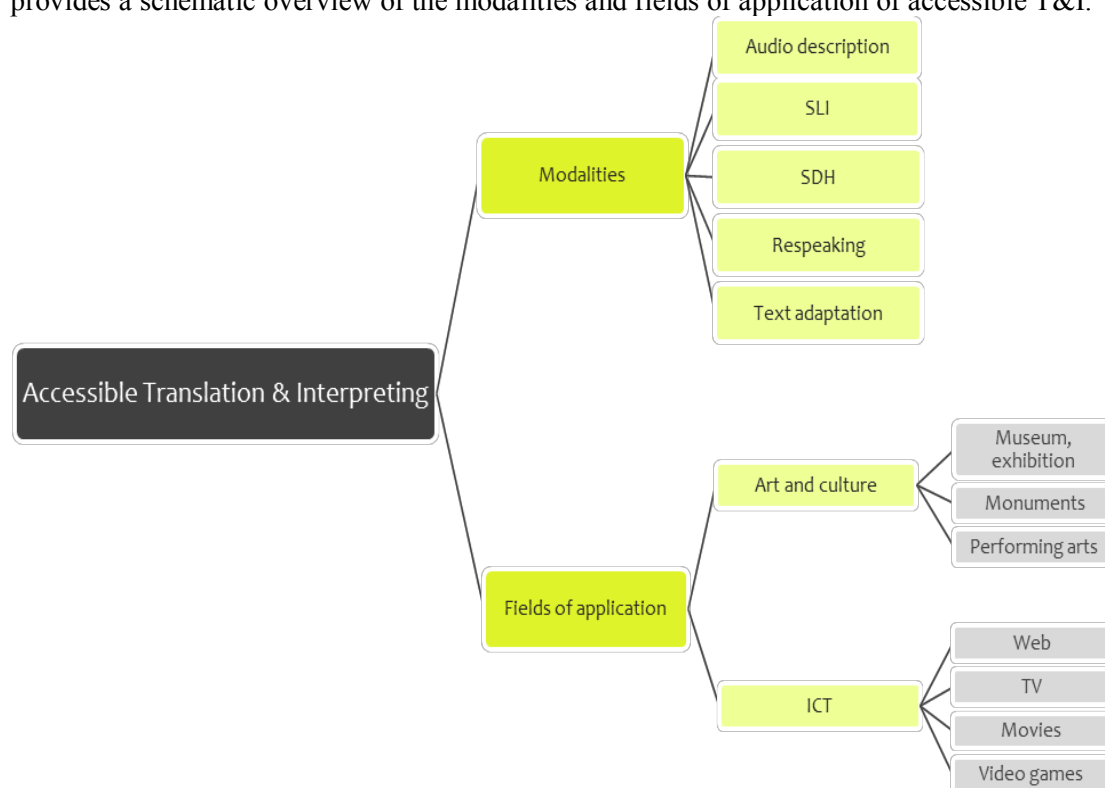


Figure 2. Modalities and fields of applications of accessible T&I

The modalities of accessible T&I used in museums and exhibitions are audio description, SLI, SDH and text adaptation. According to this classification, the new professional profiles and training pathways for translators and interpreters within the field of museum universal accessibility can be catalogued as follows: a) sign language interpreter of museum texts; b) museum guide and sign language interpreter; c) museum subtitler; d) museum audio describer;

⁷ The way in which translation and interpreting are carried out and the mental operations made in this process.

⁸ The type of communicative event and social situation in which the translator or interpreter's work takes place.

e) museum audio describer and guide; f) museum text adapter for visitors with different abilities; g) expert and advisor on museum accessibility through translation and interpreting.

Within the specific context of museums and exhibitions, these translators and interpreters perform the following roles:

a) Sign language interpreter of museum texts

Role: interpreting the texts in the museum and its exhibitions into sign language. These interpretations are then made available as video files to be accessed through the resources provided by the museum (museum's institutional multimedia website, sign language guide).

Target users: hearing-impaired people who use sign language.

b) Museum sign language interpreter and guide

Role: interpretation of the texts in the museum and its exhibitions for individual or group guided tours.

Target users: hearing-impaired people who use sign language

c) Museum subtitler

Role: subtitling the sign language guide and the museum's elements and exhibitions that so require.

Target users: oral deaf and hard of hearing people.

d) Museum audio describer

Role: audio description of the museum and its exhibitions to be accessed through the resources provided by the museum (museum's institutional multimedia website, audio guide).

Target users: visually-impaired people.

e) Museum audio describer and guide

Role: audio description of the museum and its exhibitions for tactile or non-tactile, individual or group guided tours.

Target users: visually-impaired people.

f) Museum text adapter for visitors with different abilities

Role: adapting the texts in the museum and its exhibitions to be displayed in exhibitions or used in multimedia guides or during individual or group guided tours.

Target users: children, teenagers, young people, oral deaf and hard of hearing people, and in general, people with different cognitive abilities, prior knowledge and interests.

g) Expert and advisor on museum accessibility through T&I

Role: advising the museum departments that so require on the available resources for accessible T&I and their suitability for each specific museum project; coordinating the implementation of those resources.

Target users: hearing-impaired people, visually-impaired people and in general people with different cognitive abilities, prior knowledge and interests.

In addition to the general competencies required of translators and interpreters and the particular competencies of each translation modality, these new profiles require developing the following specific competencies, which are shared by all the profiles within accessible T&I:

- Recognizing human diversity, its dynamic and universal nature, and its positive dimension.
- Knowing and giving reasons for the social, economic, regulatory and ethical origins of Universal Accessibility.
- Knowing the different resources for the elimination of barriers hindering equal opportunities.

- Knowing the basic concepts of the human perception, cognition and communication processes.
- Ability to link the concepts of perception, cognition and communication with the accessible translation and interpreting process.
- Ability to detect and evaluate accessibility problems related to accessible translation and interpreting in different settings.
- Ability to introduce accessibility as a cross-cutting element in the different fields of application of accessible translation and interpreting.

Likewise, as these profiles belong to the field of museums and exhibitions, they require having subject matter competencies in the basic principles of Museum Studies, as well as knowledge on the specific subject matter dealt with in each museum or exhibition. However, the latter is a competence to be developed during a translator's professional career, for the goal of T&I university studies is to provide comprehensive training based on the development of core competencies.

4. Universal accessibility in a science museum

Within the framework of the Andalusian Government's Excellence Project AMATRA, Tracce (Translation and Accessibility) research group is carrying out a project on universal accessibility in museums through T&I named *Translation and Accessibility. Science for All* in cooperation with Granada's Parque de las Ciencias [*Granada's Science Park Museum*]. This is a worldwide renowned interactive museum of over 70,000 m² containing the following exhibition areas: Macroscopio Building, which houses six of the permanent exhibitions and exhibition rooms of the museum; Foucault's Pendulum Building, which houses another four permanent exhibition rooms and the Planetarium; the Milky Way building, used for temporary exhibitions; the museum's outdoor area, an open-air space with different science modules, botanical gardens and an area to observe birds of prey in flight; the Tropical Butterfly House and the Observation Tower.

The main aim of this project is to develop a multimedia guide prototype for the museum using the T&I modalities for museum accessibility: audio description (AD) for visually-impaired people, sign language interpreting (SLI) for hearing-impaired people who use sign language, subtitling for oral deaf and hard of hearing people (SDH), and text adaptation for people with different levels of prior knowledge (lay, semi-lay and expert) and cognitive abilities (children, teenagers, young people, elderly people). This multimedia guide being a prototype, the work carried out did not intend to be exhaustive, but show the application of each of the modalities above to a selection of exhibits in the museum. Specifically, it was decided to limit the work area to just one exhibition, the one in the *Journey through the Human Body* Pavilion (see Figure 3).



Figure 3. Journey through the Human Body Pavilion, Granada Science Park Museum.

This exhibition in turn comprises a series of rooms divided into several thematic modules. For the purposes of this project, it was decided that the work be focused on two rooms: “Reproductive System” and “Nervous System”. This decision was made after consulting with a professional audio describer and a professional sign language interpreter. The reasons for this decision were the following: firstly, these rooms offer a wide variety of exhibits, thus allowing the prototype to be as illustrative as possible. The “Reproductive System” room was found to be particularly suitable for the development of accessibility resources targeted at visually-impaired people, for it contains two modules with tactile exhibits (“Formar y crecer” [*Formation and Growth*] and “Me puedes ver” [*You can see me*]) as well as one of the three videos in the pavilion which could be audio described (“El parto” [*Childbirth*]). Regarding the “Nervous System” room, the abovementioned professionals considered that, despite currently being the least accessible room, it was interesting to include it in the prototype for the topics it dealt with were closely linked with sensory disabilities, and thus could especially attract the interest of visitors with this type of disabilities. Also, it posed a challenge for the team working in this project.

Later on, the prototype was completed with further audiovisual materials from the following rooms in the pavilion: “Entrance Hall” (pavilion presentation), “Digestive System” (Somos lo que comemos [*We are what we eat*]), and “Genetics” (AND [*DNA*]). The first one is the presentation and introduction to the exhibition, so its inclusion in the prototype would help contextualizing the contents in the two chosen rooms. Regarding the two other videos, they were chosen to illustrate the use of accessibility resources targeted at hearing-impaired people. The contents in these videos pose special difficulties for this type of visitors due to their high level of specialization, which results in an abundant use of scientific terminology. They needed to be adapted both for oral deaf and hard of hearing people, whose reading and writing skills are not as developed as those of people with normal hearing, and for the hearing impaired who use sign language, because the existing scientific vocabulary in Spanish sign language is still limited.

The accessible multimedia guide prototype developed comprises two main elements: the contents and the electronic media to access them. The contents are roughly as follows:

a) Audio guide

Target user: visually-impaired adults

Contents: voice narration of written texts: panels and signs; audio description of spaces and objects; audio description of audiovisual products.

b) Sign language guide

Target user: hearing-impaired adults using sign language

Contents: sign language interpretation of printed texts: panels and signs; sign language interpretation of audiovisual products.

c) Video guide

Target user: oral deaf and hard of hearing adults

Contents: subtitling of audiovisual products for the hearing impaired

d) Children's audio guide

Target user: visually-impaired children

Contents: text adaptation of the adult audio guide and voice narration of text

e) Audio guide for young people

Target user: visually-impaired young people

Contents: text adaptation of the adult audio guide and voice narration of text

Concerning the electronic media where these contents could be accessed, it was decided to use an adapted Wordpress blog for their correct display on iPod Touch and iPhone devices. The blog's name is TACTO (Traducción y Accesibilidad. Ciencia para Todos) [*Translation and Accessibility. Science for All*] and is available on: tacto.tracce.es. In order to show these contents, below there are some sample fragments of the accessible multimedia guide:

(1) Content: Audio guide

Room: Reproductive System

Module: Encontrándonos [*Finding each other*]

Exhibit: Encontrándonos [*Finding each other*]

Exhibit type: illuminated model-diagram

T&I modality: audio description

Visitor type: visually-impaired adults

Audio description script (ADS): [VOICE 1] A sign reads as follows: [VOICE 2] Fertilization is a complex process through which an ovum and a sperm cell fuse into one. The nucleus of each of these cells contains 23 chromosomes. The result of this fusion is a new cell, the zygote or egg, with 46 chromosomes, which is the starting point for the development of a new individual. This development requires a space and an environment providing everything the new being needs to grow and become mature: the uterus. The zygote will reach the uterus by travelling through the fallopian tube in the opposite direction to that followed by the sperm. Most of the million sperm cells released into the vagina do not reach the fallopian tube. Of those who make it, only one, after losing its tail, will penetrate the ovum's protective coating and fertilize it.

[BELL SOUND]

[VOICE 1] A meter away from the sign there is a glass display case. Inside the case there are two scale models: a 40 x 20 cm ovum, and an 80 x 80 cm female reproductive system. The latter has LED lights. Below the glass there is a button. When you press it, the LED lights flash intermittently: the white lights simulate the movement of sperm cells in the vagina; the yellow ones show the ovum moving through the left fallopian tube, and the green ones show the moment of fertilization and the movement of the fertilized ovum towards the uterus.

At the bottom of the glass case there is a sign with the names of those movements and their corresponding color.

The ovum model shows a cut section of this cell displaying the different layers it comprises: the nucleus in dark pink, the cytoplasm in a medium shade of pink and the outside coating, which has an irregular shape, in brown. The ovum is surrounded by sperm cells trying to penetrate it, but only one of them has made it.

[BELL SOUND]

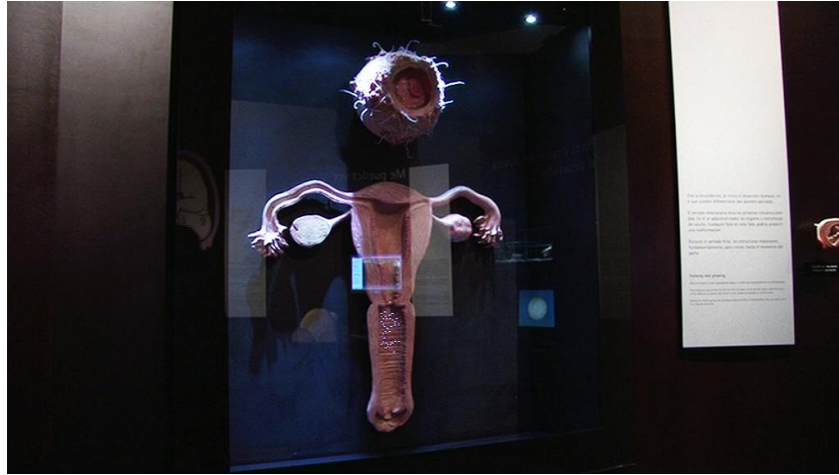


Figure 4. Exhibit: Encontrándonos [*Finding each other*], *Journey through the Human Body Pavilion*

(2) Content: Audio guide

Room: Nervous System

Module: Sistema nervioso [*Nervous System*]

Exhibit: Encéfalo y médula espinal [*Brain and spinal cord*]

Exhibit type: object

T&I modality: audio description

Visitor type: visually-impaired adults

Audio description script (ADS): [VOICE 1] A sign reads as follows: [VOICE 2] The human nervous system is one of the most complex mechanisms ever created by Nature. It conveys information about the world around us through the senses. It controls all the processes taking place in our body, gathers information from the different parts of the body and sends instructions for their proper functioning. Besides, it is the intelligence center that enables us to feel, learn, remember, reason, imagine, create, project, believe, enjoy ourselves...

[BELL SOUND]

[VOICE 1] One meter away from the sign there is a cylindrical display case screwed to the wall at a medium height. Inside there is a central nervous system: brain, cerebellum and spinal cord.

[BELL SOUND]



Figure 5. Exhibit: “Encéfalo y médula espinal” [*Brain and spinal cord*], *Journey through the Human Body Pavilion*

(3) Content: Audio guide

Room: Nervous System

T&I modality: Audio description

Visitor type: visually-impaired adults

Audio description script (ADS): The Nervous System room is a circular open space. There is a round table in the middle of the room containing an experiment to test motor skills which produces sounds. There are also panels on the room walls. Visitors should walk clockwise around the room. If anyone were doing the activity, those sounds could be heard. This table will be described at the end of the walk round the room.



Figure 6. “Nervous System” room, *Journey through the Human Body* Pavilion

(4) Content: Audio guide

Room: Nervous System

Visitor type: visually-impaired young people (German)

German audio description script (ADS): Ihr befindet euch jetzt im Ausstellungssaal des Nervensystems in der Messehalle zum Menschlichen Körper. Dieser ist ein offener und kreisförmiger Raum. In der Mitte steht ein runder Tisch und an den Wänden hängen Tafeln. Ihr legt die Route am besten im Uhrzeigersinn zurück.

Im Zentrum des Raumes steht dieser runde Tisch mit einem Experiment, mit dem ihr eure motorischen Fähigkeiten testen könnt. Die dazugehörigen Apparate erzeugen Geräusche. Wenn irgendjemand dieses Experiment durchführt, werdet ihr dieses Geräusch hören. Dieser Tisch wird am Ende des Rundgangs näher beschrieben.

[BELL SOUND]

Discussion: In this first fragment in German, there are noticeable differences in the register used when addressing young people and families. Besides the use of the colloquial form of the second person singular, time modal particles such as *jetzt* or base lexemes such as *Tafel* instead of *Panel*, or *Messehalle* instead of *Pavillon*, which are used in the audio guide for expert adults, there are also differences in the syntactic and discourse structures, which are aimed at respecting the cognitive abilities of young people and families who expect their visit to the museum to be recreational. Their process of attention is also different from the expert German visitor's, whose greater knowledge about the subject matters dealt with in the exhibition enables him/her to process a more complex and, cognitively speaking, more condensed syntax. The expectations of politeness play a major role here. For instance, the German socio-cultural context requires that texts are adapted to each type of addressee. The use of non-polite personal pronouns can sound strange to German young people, and have a clear appellative function.

(5) Content: Audio guide

Room: Nervous System

Visitor type: visually-impaired, expert knowledge (German)

German audio description script (ADS): Der Ausstellungssaal des Nervensystems im Pavillon „Der Menschliche Körper“ ist ein offener, kreisförmiger Raum. In der Mitte befindet sich ein runder Tisch mit einem Experiment zur motorischen Geschicklichkeit, bei dessen Betätigung Geräusche erzeugt werden. An den Wänden hängen Paneele. Die Begehung erfolgt im Uhrzeigersinn. Der Tisch wird am Ende des Rundgangs detaillierter beschrieben.

(6) Content: Sign language guide

Room: Nervous System

Module: El gusto es mío [*Good Taste*]

Exhibit: El gusto es mío [*Good Taste*]

Exhibit type: printed text

T&I modality: Spanish sign language interpretation (SLI) of printed text

Visitor type: hearing impaired (using sign language)



Figure 7. Spanish SLI of the exhibit entitled “El gusto es mío” [*Good Taste*] (printed text)

Printed text: Good taste. We have around 4,000 taste buds, which are mainly found in our tongue, but also in our mouth and throat. Each taste bud has around one hundred taste receptor cells. We can identify four basic tastes: sweet, located on the tip of the tongue; salty, on either side of the front of the tongue; sour, on both sides of the tongue back; and bitter at the back.

Discussion: Sign language being a minority language with a restricted use in science and technology, the interpretation of the exhibition posed great difficulty due to the lack of scientific terminology in Spanish sign language, which did not have equivalents for the words used in the Spanish ST. The technique used to tackle the lack of terminology was coinage in Spanish sign language. Coinage is frequently used in Spanish sign language interpreting, particularly among the interpreters working in educational establishments and research centers as a result of the recent incorporation of deaf people into the academic world. This project’s newly-created signs have been compiled and organized into glossaries to make them available for consultation and dissemination. Regarding the interpretation of the exhibit title, the original “*El gusto es mío*” (which means “Nice to meet you”, and can also refer to gustation) was translated into Spanish sign language as “Gusto bueno” [*Good taste*]. The reason for this is that a literal translation of the original title does not have a double meaning in Spanish sign language nor is a common expression in this language either. Therefore, in order to keep the ST intention as much as possible, a play on signs was made using the same handshape for the two signs in the phrase: “gusto” [*taste*] and “bueno” [*good*].

(7) Content: Sign language guide

Room: Genetics

Module: Del genoma al organismo [*From the genome to living organisms*]

Exhibit: El ADN [*DNA*]

Exhibit type: Audiovisual virtual multimodal (video)

T&I modality: integrated Spanish sign language interpretation

Visitor type: hearing impaired (using sign language)



Figure 8. Exhibit entitled “ADN” [*DNA*] with integrated Spanish SLI.

Transcription: If we could travel inside our body and get into one of our cells, we would see 23 pairs of chromosomes packed into a nucleus. Each chromosome contains a long DNA strand. If we unraveled the DNA strands of the 23 chromosomes in one cell, the DNA strand would be over one meter and a half long. The DNA double helix contains genetic information by means of four chemical bases: A, which always pairs up with T, and C, which pairs up with G.

(8) Content: Video guide

Room: Entrance hall

Exhibit: ADN [*DNA*]

Exhibit type: Virtual multimodal (video)

T&I modality: Subtitling for the deaf and hard of hearing (SDH)

Visitor type: oral deaf and hard of hearing people



Figure 9. Exhibit entitled “ADN” [*DNA*] with literal SDH

Subtitled text: *If we could travel inside our body and get into one of our cells...*

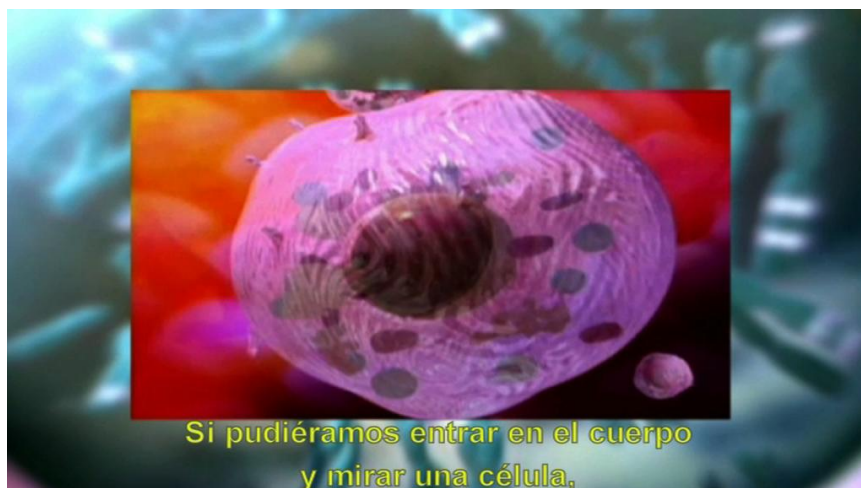


Figure 10. Exhibit entitled “ADN” [DNA] with adapted SDH
 Subtitled text: *If we could get into our body and look at a cell...*

Discussion: As can be seen in this last example, the video guide including subtitles for oral deaf and hard of hearing people features two types of subtitles: one type with a literal transcription of the content, and another type in which subtitles have been adapted to deaf people’s cognitive abilities. Both types of translation respond to social demands as well as to textual functions. Whereas the main function of the transcribed subtitles is to help readers learn Spanish language structures (this having priority over other functions, such as access to knowledge on basic cell biology), the second type of subtitles offers an alternative to approach the text in a recreational way, without requiring any extra cognitive efforts, and providing a series of aids (such as emoticons or non-spelled-out numbers) aimed at facilitating deaf people’s access to knowledge. The vocabulary used has been simplified (“get” is used instead of “travel” in the example), and syntax has also undergone a simplification process (elimination of present participles and replacement of certain verbal forms –the conditional tense has been replaced by the indicative present, as shown in the example), and base lexemes or prototypes have been used instead. Also, some possessive pronouns and complex structures (such as the one starting with “mediante” [*by means of*]) have been eliminated.

5. Conclusions

According to the latest trends in Museum Studies, museum visitors seek entertainment experiences that link fun firstly to a learning process and secondly to an emotional experience. A museum must be a living, open and dynamic being, a meeting point where each sector of society can play its corresponding role by means of a wider array of visitor options.

If their aim for the future is to open up new fields for research and learning, and to provide training for new career paths, Translation Studies should then approach the tempestuous world of multimodality and study the different ways to make it accessible to every potential user having different possibilities to access knowledge.

To this end, the new museum concept makes it possible to view and analyze museums as multimodal communicative events. The study of this multimodal event and its translation requires analyzing and understanding the mechanisms for meaning construction in each semiotic mode, both individually and when they interact with other modes. The old but proved and well-established linguistic theories, as well as social pragmatics and communicative action theories can provide directions and guidelines for this.

However, there is still a long way to go in this field, and Universities should contribute to progress by creating new professional profiles and implementing the corresponding curricula and training pathways to train future graduates to acquire the specific competencies for carrying

out universal accessibility plans in the different spheres of society that so require. This specific training is an essential step towards the creation of new professional profiles linked to universal accessibility, but it is not the only step to be taken. At the same time, those in charge of the spaces, services and products requiring accessibility measures should become aware of this need and demand the services of these professionals with a specific and quality training: translators and interpreters specialized in translation for accessible multimodal spaces.

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BIONOTES / NOTAS BIOGRÁFICAS

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BA in Translation and Interpreting, University of Granada in 2005. Diploma in Commercial and Economic Chinese Advanced Level, University of International Business and Economics of Beijing (2005-2007), as holder of a scholarship by the Spanish Foreign Affairs Ministry and International Cooperation Agency (MAE-AECI). MA in Translation and Interpreting, University of Granada (2007-2008). Member of the research group *HUM 770 Aula de investigación del texto multimedia* of the Andalusian research programme since 2009 and of the following research projects: AMATRA (P07-SEJ-2660) and PRA2 (FFI2010-16142). She has also participated in the research project TRACCE (SEJ2006-01829/PSIC). Since 2010 she is a PhD candidate at the Department of Translation and Interpreting of the University of Cordoba as a holder of a doctoral scholarship granted by the Andalusian Government, currently writing her PhD dissertation on translation and interpreting as a tool for universal accessibility at museums.

Licenciada en Traducción e Interpretación por la Universidad de Granada en 2005. Diploma en chino económico y comercial nivel avanzado por la University of International Business and Economics de Beijing (2005-2007), como becaria de MAEC-AECI. Máster Oficial en Traducción e Interpretación por la UGR, edición 2007-2008. Miembro del grupo de investigación del Programa Andaluz de Investigación *HUM 770 Aula de investigación del texto multimedia* desde 2009, del proyecto de excelencia de la Junta de Andalucía AMATRA (P07-SEJ-2660), y del proyecto de I+D PRA2 (FFI2010-16142), y ha colaborado en el proyecto de I+D TRACCE (SEJ2006-01829/PSIC), todos ellos dirigidos por Catalina Jiménez Hurtado. Desde 2010 es becaria predoctoral de la Junta de Andalucía adscrita al Departamento de Traducción e Interpretación de la Universidad de Córdoba y realiza su tesis doctoral en torno a la traducción-interpretación como recurso de accesibilidad universal en museos. Compagina su labor investigadora con la traducción del chino y el inglés.